



Housing price growth and the cost of equity capital[☆]



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ABSTRACT

Building on recent research linking changes in housing prices to investors' degree of risk aversion, we posit that there is a negative relation between growth in housing prices and a firm's cost of equity capital. Consistent with our hypothesis, we find that firms located in states with positive growth rates in housing prices exhibit lower costs of equity capital. We also observe that the effect of changes in housing prices is mainly driven by smaller firms. This housing effect is not only statistically significant but also economically important. Our results hold across various measures of growth rates in housing prices and are robust to controlling for potential biases due to measurement errors in estimating the implied cost of equity capital. This study is the first to establish an association between growth rates in housing prices and firms' cost of equity capital. It also contributes to the emerging literature on the economic importance of a firm's geographic location.

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1. Introduction

An extensive body of theoretical and empirical research provides evidence of a spillover effect from the real estate markets to household consumption decisions, investment portfolio choices and stock prices (e.g., [Campbell and Cocco, 2007](#); [Piazzesi et al., 2007](#); [Chu, 2010](#); [Gan, 2010](#); [Sousa, 2010](#); [Anderson and Beracha, 2012](#)). For instance, [Sousa \(2010\)](#) shows that housing wealth vari-

ation has a persistent effect on aggregate household consumption. [Anderson and Beracha \(2012\)](#) report that city-specific home price patterns conditionally affect the stock prices of local firms, suggesting that investor behavior is influenced by local shocks to household real estate wealth.

Another stream of studies considers a possible association between growth in housing prices and investors' degree of risk aversion (e.g., [Grossman and Laroque, 1990](#); [Flavin and Nakagawa, 2008](#); [Paravisini et al., 2014](#)). These studies present findings implying that growth in housing prices lead to an increase in households' wealth and therefore to a lower degree of investors' absolute risk aversion. For example, [Zanetti \(2014\)](#) demonstrates that the presence of housing enables households to hedge against unexpected shocks and decreases relative risk aversion. [Paravisini et al. \(2014\)](#) show that risk aversion increases after a negative housing wealth shock, and based on the [Campbell and Cochrane \(1999\)](#) model, when investors become more risk averse, they require a higher risk premium. Building on this literature, we hypothesize that there is a negative relation between growth in housing prices and a firm's cost of equity capital. The cost of equity capital is central for valuation, portfolio selection and capital budgeting. Not surprisingly, numerous studies have demonstrated an association between key economic variables and a firm's cost capital (e.g., [Hann et al., 2013](#); [Ortiz-Molina and Phillips, 2014](#)).

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To examine the association between housing price growth and the cost of equity capital we take advantage of the strong evidence of local bias² and the heterogeneity in regional housing prices within the U.S. (Beracha and Hirschey, 2009). To estimate the implied cost of equity capital, we adopt the Gebhardt et al. (2001) (GLS) model.³ To avoid the aggregation problems associated with a one-size-fits-all approach, we estimate a GLS model for different subgroups of firms in which forecast horizons are set in relation to the annual growth rate of a firm's respective industry.

Consistent with our prediction, we find that growth in housing prices negatively influences firms' cost of equity capital. This housing effect is not only statistically significant but also economically important: an increase of one standard deviation in housing prices is associated with a decrease of 5 to 8 basis points in equity financing costs. Notably, we find that the effect of housing on the cost of equity capital is primarily driven by smaller firms, which is consistent with our conceptual framework.

We conduct several analyses to mitigate concerns about measurement errors induced by the assumptions embedded in the GLS model. For instance, we account for the effects of stock repurchases, address potential analysts' bias and sluggishness, and re-estimate the GLS model under different assumptions, including changing forecast horizons. We also find that the statistical significance of our results is maintained when we use the fitted values from the regression of ex-post realized returns on a set of six ex-ante measures of the cost of capital as proxies for expected returns.⁴

This study contributes to the growing body of literature on the implications of change in housing prices. The extant literature examines the effects of housing prices on household consumption, household asset allocation, and asset pricing. To the best of our knowledge, this study is the first to establish a statistically significant association between housing price growth and the cost of equity capital. Accordingly, the paper contributes to the growing literature on the determinants of cost of equity capital (e.g., Daouk et al., 2006; Hail and Leuz, 2009; Chava and Purnanandam, 2010; Hann et al., 2013; Ortiz-Molina and Phillips, 2014). We believe that the econometric estimation of the implied cost of equity capital measures based on data partitioned at the industry level is also new. Previous studies on firm location have emphasized the information advantage associated with geographic proximity.⁵ We contribute to this stream of the literature by introducing geographic proximity as a determinant of the cost of equity capital.

In a related study, Louis and Sun (2013) examine the relation between long-term stock returns and housing prices over the period 1979–2002. They find that higher past four-year housing price growth is associated with lower subsequent four-year stock returns. There are several important differences between the research approach taken by Louis and Sun and this paper. First,

² Several studies show that investors tend to invest a disproportionate share of their stock portfolios in local firms (e.g., Coval and Moskowitz, 1999, 2001; Ivkovic and Weisbenner, 2005; Loughran and Schultz, 2005; Pirinsky and Wang, 2006; Hong et al., 2008).

³ Our choice of the GLS approach is rationalized in Section 3.3 of this paper.

⁴ We caution, however, that our various attempts and approaches to address measurement errors in the GLS model are neither perfect nor likely to be successful for every firm. Although we augment our analysis with a measure of realized returns, it is important to note that our interpretation of the link between the cost of equity and growth in housing prices depends on the quality of the (ex-ante and ex-post) measures that we use to proxy for the cost of equity capital.

⁵ Previous studies report that the information advantage associated with geographic proximity explains the local bias documented in both mutual fund investments (Coval and Moskowitz, 1999, 2001) and individual investors' portfolio decisions (e.g., Ivkovic and Weisbenner, 2005; Pirinsky and Wang, 2006). Moreover, it affects analysts' forecasting accuracy (Malloy, 2005), information resolution for bank lending (Agarwal and Hauswald, 2010), and corporate decision making (e.g., John et al., 2011).

our study examines the association between cost of equity capital and housing prices. As discussed later in the paper, inferring cost of equity ex-post from realized returns is problematic (e.g., Fama and French, 1997; Elton, 1999). Hence, our research question and methodology are inherently different from Louis and Sun (2013). In fact, Louis and Sun do not claim that their research questions or findings are related to expected returns or/and cost of capital. Second, Louis and Sun's findings are sensitive to the choice of time horizon for the measures of housing price as well as stock returns. Our results show that the negative relation between cost of equity capital and housing prices is persistent and robust to several factors including the choice of time horizon and different measures of change in housing prices. Third, using some suggestive evidence, Louis and Sun (2013) argue that their inferences stem from wealth effects altering demand for stocks. Our research hypothesis is grounded on a stream of theoretical and empirical studies showing that changes in housing prices influence investors' degree of risk aversion.

The remainder of this paper is organized as follows. Section 2 develops our main testable hypothesis. In Section 3, we describe the data and report summary statistics on our regression variables. Section 4 presents our main evidence on the association between growth in housing prices and the cost of equity. Section 5 provides sensitivity analyses. Section 6 concludes.

2. Hypothesis development

We develop our hypothesis linking growth in housing prices to firms' cost of equity capital through the channel of the agent's degree of risk aversion. Although Arrow (1965) and Pratt (1964) obtained measures of relative risk aversion from models that omitted the role of housing, recent papers such as Rubio (2011) suggest that housing prices may play a critical role in understanding risk aversion. Indeed, several studies (e.g., Grossman and Laroque, 1990; Flavin and Nakagawa, 2008) suggest an association between housing prices and risk aversion. In particular, the risk-aversion effect of (housing) wealth has received theoretical support from Zanetti (2014), who demonstrated that housing may generate state-dependent, time-varying risk aversion. The key conclusion from Zanetti (2014) is that both consumption preferences and housing stock are relevant to a household's attitude toward risk. Furthermore, Paravisini et al. (2014) provide empirical evidence not only that the elasticity of absolute risk aversion with respect to changes in housing value is statistically significant and negative but also that investors become more risk averse after a negative shock to housing wealth.⁶ Therefore, the effect of an increase in household wealth on equity pricing is delineated as follows. Because the agent's degree of risk aversion is negatively related to its wealth⁷ (primarily housing wealth), then as housing prices rise, households' degree of risk aversion decreases. The decreasing degree of risk aversion subsequently reduces the conditional market price of risk and results in a lower required rate of return on stocks (e.g., Campbell and Cochrane, 1999; Lettau and Ludvigson, 2001).

The potential association between housing price growth and a firm's cost of equity capital may be affected by a local bias for at least two reasons. First, there is strong evidence of local bias in housing prices, which leads to heterogeneity in regional housing prices within the U.S. (Beracha and Hirschey, 2009). Second, local bias studies find that investors have a strong preference for holding

⁶ Housing wealth is the primary source of private wealth worldwide. For example, in the U.S., where the residential real estate market has more than \$20 trillion in capital value, more than two-thirds of households are homeowners (Tracy and Schneider, 2001; Bertaut and Starr-McCluer, 2002; Anderson and Beracha, 2012).

⁷ See, for example, Arrow (1971), Holt and Laury (2002), and Paravisini et al. (2014).

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